

CHAPTER 3

EMPOWERING WOMEN IN TECHNOLGY

RESEARCH METHODOLOGY

Solomon Andoh10908662
0507884529

3.1 Introduction

This chapter delineates the research methodology employed in the study, which seeks to investigate the factors contributing to the underrepresentation of females in computer science and information technology (IT). It encompasses the research design, population and sampling strategy, data collection methods, data analysis procedures, validity and reliability measures, ethical considerations, and limitations of the study. The chosen methodology aims to rigorously address the research questions and provide a robust foundation for the interpretation of findings.

3.2 Research Design

The study adopts a mixed-method research design to explore the multifaceted reasons behind the avoidance of computer science and IT by females. A qualitative approach is employed to capture the nuanced experiences and perspectives of the participants, while a quantitative approach facilitates the measurement of broader trends and correlations within the data. The mixed-methods design allows for a comprehensive analysis, integrating both subjective and objective insights to address the research objectives holistically.

Qualitative Component: The qualitative component of the study involves in-depth semi-structured interviews and focus group discussions with female participants. This approach enables the exploration of individual narratives and collective experiences, providing a deeper understanding of the socio-cultural and psychological factors that influence females' decisions to pursue or avoid careers in computer science and IT.

Quantitative Component: The quantitative component consists of a structured survey distributed to a larger sample of female students and professionals. This method allows for the collection of data that can be statistically analyzed to identify patterns, trends, and potential correlations between variables such as age, education level, socio-economic background, and attitudes toward computer science and IT.

3.3 Population and Sampling Strategy

The target population for this research comprises females who are either currently enrolled in computer science or IT programs, have considered such programs, or are professionals in the IT industry. The study employs a probability sampling strategy to ensure that the sample is representative of the diverse demographic characteristics within the population.

Sampling Frame: The sampling frame includes female students from secondary schools, universities, and professional women in the IT sector across [mention specific regions or countries if applicable]. The selection of participants is guided by the need to capture a wide range of experiences and perspectives.

Sample Size: A total sample size of 250 participants will be selected, with 150 allocated to the qualitative component and 100 to the quantitative component. This sample size is deemed sufficient to achieve data saturation in the qualitative analysis and to provide statistically significant results in the quantitative analysis.

Sampling Technique: For the qualitative component, purposive sampling is employed to identify participants who have rich, relevant experiences and are willing to share their insights. For the quantitative component, stratified random sampling is used to ensure that the sample is proportionately representative of various sub-groups, such as different age groups, educational levels, and geographical locations.

3.4 Data Collection Methods

The study utilizes a combination of qualitative and quantitative data collection methods to gather comprehensive and triangulated data.

Semi-Structured Interviews: In-depth semi-structured interviews are conducted with a subset of participants to explore their personal experiences, motivations, and challenges related to computer science and IT. The interview guide is developed based on the literature review and pilot-tested to ensure clarity and relevance. Interviews are recorded with participants' consent and transcribed verbatim for analysis.

Focus Group Discussions Focus groups are organized to facilitate a dialogue among participants, encouraging them to discuss shared experiences and common challenges. These discussions provide insights into group dynamics and the influence of peer perceptions on females' decisions regarding computer science and IT. The focus group discussions are moderated by the researcher, ensuring that all participants have the opportunity to contribute.

Structured Surveys: A structured survey instrument is designed to collect quantitative data from a larger sample. The survey includes a combination of closed-ended questions, Likert-scale items, and demographic questions. The survey is administered online to reach a geographically diverse population and is designed to take no more than 15 minutes to complete, enhancing response rates.

3.5 Data Analysis Procedures

The data analysis procedures are tailored to the nature of the data collected and are designed to rigorously answer the research questions.

Qualitative Data Analysis: Thematic analysis is employed to analyze the qualitative data obtained from interviews and focus group discussions. This process involves coding the data, identifying recurring themes, and interpreting these themes in the context of existing literature. Thematic analysis allows for the identification of both explicit and implicit patterns in the data, providing a rich, detailed understanding of the factors influencing females' engagement with computer science and IT.

Quantitative Data Analysis: The quantitative data from the surveys are analyzed using statistical techniques, including descriptive statistics, correlation analysis, and regression analysis. Descriptive statistics provide an overview of the sample characteristics and key variables. Correlation analysis is used to examine the relationships between variables such as socio-economic status, prior exposure to computer science, and attitudes toward IT. Regression analysis is conducted to identify predictors of females' decisions to pursue or avoid careers in computer science and IT.

3.6 Validity and Reliability

Ensuring the validity and reliability of the research findings is paramount to the credibility of the study.

Validity: The study employs multiple strategies to enhance validity, including triangulation, member checking, and the use of validated instruments. Triangulation involves the use of multiple data sources and methods to cross-verify findings, thereby reducing the risk of bias. Member checking is conducted by sharing preliminary findings with participants to ensure that their views are accurately represented. The survey instrument is adapted from existing validated scales, with modifications made to suit the research context.

Reliability: Reliability is ensured through consistent data collection procedures and the use of standardized instruments. The survey is pilot-tested to refine questions and improve reliability. The interview and focus group protocols are carefully designed to ensure that all participants receive the same set of questions and prompts, minimizing variation in data collection.

3.7 Ethical Considerations

Ethical considerations are integral to the research process, ensuring the protection of participants' rights and the integrity of the research.

Informed Consent: Informed consent is obtained from all participants before data collection begins. Participants are provided with a detailed information sheet explaining the purpose of the study, the procedures involved, their rights as participants, and the measures taken to protect their confidentiality. Consent forms are signed electronically or in person, depending on the mode of participation.

Confidentiality and Anonymity: The confidentiality of participants' data is maintained through the use of pseudonyms and the secure storage of data. Personal identifiers are removed from transcripts and survey responses to ensure anonymity. Data is stored in encrypted digital files, accessible only to the research team.

Ethical Approval: Ethical approval is obtained from [mention the relevant ethics committee or institutional review board], ensuring that the study complies with ethical standards for research involving human participants.

3.8 Limitations of the Study

While the research methodology is designed to comprehensively address the research questions, certain limitations must be acknowledged.

Sample Representativeness: The sample may not fully represent the diversity of the female population in computer science and IT, particularly in terms of geographical and socio-economic diversity. While efforts are made to include a broad range of participants, the findings may not be generalizable to all contexts.

Self-Report Bias: The study relies on self-reported data, which may be subject to biases such as social desirability bias or recall bias. Participants may provide responses they believe are expected or may not accurately recall their experiences.

Time Constraints: The data collection process is subject to time constraints, which may limit the depth of qualitative data collected and the number of participants that can be included in the study.

3.9 Conclusion

This chapter has outlined the research methodology, detailing the research design, population and sampling strategy, data collection methods, data analysis procedures, and ethical considerations. The methodology is designed to provide a rigorous and comprehensive investigation into the factors contributing to the underrepresentation of females in computer science and IT. By integrating qualitative and quantitative approaches, the study seeks to uncover both the individual and systemic barriers that deter females from pursuing careers in these fields.